# MATHEMATICS ASSESSMENT PROGRAM 1987

## PRELIMINARY REPORT

**Manitoba Education**
Curriculum Development and Implementation

# MANITOBA MATHEMATICS ASSESSMENT PROGRAM 1987

## PRELIMINARY REPORT:
## TEST DATA

A REPORT OF THE ASSESSMENT SECTION OF THE
CURRICULUM DEVELOPMENT AND IMPLEMENTATION BRANCH
MANITOBA EDUCATION
PROVINCE OF MANITOBA

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# PREFACE

The Provincial Assessment of Mathematics was conducted at grades 3, 6, 9, and 12. There are three major components to the assessment: 1) a written test of the curriculum objectives carried out in May, 1987 for grades 3, 6, 9, and in June, 1987 for grade 12 (Mathematics 300 and Mathematics 301); 2) a survey of teachers at these grade levels; and 3) a 1981-86 comparison testing for grades 3, 6, 9, and 12 (General and Mathematics 300) conducted in June, 1986.

In each case a sample of students or teachers was used. This Preliminary Report contains a summary of student performance data based on component (1). The Final Report will contain results from all three components as well as conclusions and recommendations based on the data and its interpretation. This report will be followed by a Summary Report containing basic recommendations for educators of mathematics. Information in these reports is based on the English Language and French Immersion mathematics programs. A companion study has been conducted for the grades 3, 6, and 9 Français Mathematics programs. Separate but similar reports are being developed for this study.

The purpose of this Preliminary Report is to provide detailed information on the first component for use by classroom teachers in the review of the results in their classrooms. The Report contains results of the provincial testing for all test areas (subtests) and for individual items. In the case of tests at the grades 9 and 12 levels, where curricular options are available, data reported for these options are not necessarily representative of the province and care should be exercised in interpretation. Subtest data only has been provided for these options.

It is necessary to refer to the student test booklets and to the scoring manuals when using any results reported here. Schools and divisions in Manitoba have received copies of the testing materials. If you require a copy of any tests and manuals, please contact us at:

Assessment Section
Curriculum Development & Implementation Branch
Manitoba Education
223-1200 Portage Avenue
Winnipeg, MB
R3G 0T5

Test copies and scoring manuals may be purchased from the Manitoba Text Book Bureau.

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# CHAPTER 1

# INTRODUCTION

The subtests delineated for the Mathematics Assessment at each grade level are reflective of the Manitoba curriculum. In component one, the items represent several levels of the cognitive domain. (See Preface for a discussion on the three components of this mathematics assessment.) All items, except some of those in the grade 3 test, were in a multiple choice format and were awarded one mark for a correct response. The grade 3 items were a mixture of multiple choice and completion or short answer format. The proportions of students selecting the response options for each item are reported. These responses indicate not only the proportion of students getting a particular item correct, but also suggest kinds of errors students may be making.

The provincial results for the four grade levels (5 tests) are presented in Chapters 2 through 5.

## Percent of Students Choosing Each Response

The proportion of students in the provincial sample choosing each of the response options (A, B. C, D, or E) for each item is presented as a percentage. The correct solution is identified by an asterisk (*) following the percent of students selecting the option. The column marked "NR" presents the percent of students who did respond to the item. The reporting of data for grade 3 completion items is explained in Chapter 2.

## Subtests

The categories and subtests identified at each grade level are listed at the beginning of the chapter which reports that grade level's results. The test items corresponding to each subtest are specified. Data include mean raw scores and corresponding percents, standard deviation or standard error of measurement.

## SAMPLING DESIGN

Grades 3 and 6. Grades 3 and 6 students were selected for testing by a systematic random sampling design. Ten percent of students in every public classroom was selected for the assessment.

Grades 9 and 12 (300 and 301). The sampling design used was a stratified cluster sampling design with schools as clusters and stratification done on a geographic basis. Schools (clusters) were selected with probability proportional to school enrollment. Means, proportions, and standard errors were computed employing a computer program specially developed by the Statistical Advisory Service, University of Manitoba. Both the number of students tested (n) as well as degrees of freedom (d.f.) are reported for the core topics of the relevant grades.

Providing provincial data on option topics posed certain difficulties since students were requested to answer items in two options only at each of these grade levels. The classroom mathematics teachers chose the two options which their students were to write. Option mean scores therefore, were provided on a stratum basis. Stratum mean scores must be interpreted with caution since not all students in a given stratum chose the same options.

The strata were described as:

| Stratum | Grade 9 | Stratum | Grade 12 |
|---|---|---|---|
| 1 | Urban | 1 | Urban |
| 2 | Hutterite | 2 | Rural small town |
| 3 | Other city/Large town | 3 | Other city/Large town |
| 4 | Remote/Northern | 4 | Remote/Northern |
| 5 | Rural/Small town | | |

Mean scores, percents, and numbers of students (n) are reported. it is meaningless to report standard errors for these option scores.

A Cautionary Note Regarding the Use of These Results

The Mathematics Assessment was designed to assess the goals and objectives of the Manitoba curriculum with the intent to identify strengths and weaknesses of the program. The written tests can be used to measure group performance and analyze the effectiveness of local programs, but are not intended to measure the achievement of individual students. If students' results on these tests are to be used for reporting purposes, they should be used only in conjunction with other information gathered on the students.

# CHAPTER 2

## PROVINCIAL RESULTS - GRADE 3

n=1282

| Subtest | | Item Numbers | Mean Raw Score | Per Cent | Standard Deviation |
|---|---|---|---|---|---|
| I.1 | Concepts of Whole Number | 1-7 | 5.44 | 77.71 | 1.28 |
| I.2 | Place Value | 8-11 | 3.46 | 86.47 | 0.94 |
| I.3 | Addition & Subtraction | 12-36 | 17.34 | 69.36 | 4.53 |
| I.4 | Multiplication & Division | 51-72 | 15.85 | 72.03 | 5.34 |
| I.5 | Fractions | 73-76 | 2.46 | 61.60 | 1.37 |
| I.6 | Patterns | 77-79 | 2.66 | 88.56 | 0.68 |
| I. | NUMBER SYSTEMS - TOTAL (65 items) | | **47.21** | **72.62** | **10.84** |
| II.1 | Linear Measurement | 80-88 | 6.14 | 68.27 | 2.24 |
| II.2 | Area and Volume | 89-92 | 2.17 | 54.27 | 1.37 |
| II.3 | Money, Time & Temperature | 93-98 | 3.92 | 65.26 | 1.85 |
| II. | MEASUREMENT - TOTAL (19 items) | | **12.23** | **64.37** | **4.45** |
| III. | GEOMETRY | 37-44 | **6.22** | **77.78** | **1.86** |
| IV. | GRAPHING | 45-46<br>99-100 | **3.12** | **78.06** | **1.11** |
| V. | PROBLEM SOLVING | 47-50 | **1.21** | **30.36** | **1.10** |
| VI. | WORD PROBLEMS* | 33-36<br>71-72<br>88<br>47-50 | **5.62** | **51.11** | **2.72** |
| VII. | ESTIMATION* | 22-23<br>31-32 | **0.92** | **23.01** | **1.06** |

* Subtests VI and VII contain items that overlap from other subtests.

# PROVINCIAL RESULTS

## MATHEMATICS ASSESSMENT 1987 - GRADE 3

This grade 3 test contains 100 items. Some are multiple-choice while others are completion items. The data below describe student responses in this way.

1. If the item is multiple-choice, the data indicate the percentage of students choosing each response. The correct response is indicated by an asterisk.

2. If the item is a completion type of question, the percentage of students who answered the question completely correctly is indicated as the "A" response. The percents in the remaining positions (B,C,D,E) relate to the percentage of students who made specific errors.

Examples

| | | | |
|---|---|---|---|
| Item 21 | A*) | 77.6% | these students had the answer correct |
| | B) | 12.6% | calculaion/fact error |
| | C) | 0.1% | operation error |
| | D) | 4.1% | regrouping error |
| | E) | 4.5% | unidentifiable error |
| | | 1.1% | no response |
| Item 29 | A*) | 59.0% | these students had the answer correct |
| | B) | 3.7% | calculation/fact error |
| | C) | 26.2% | reversal or subtraction from 0 error |
| | D) | 3.3% | regrouping error |
| | E) | 5.8% | unidentifiable error |
| | | 2.0% | no response |

These two sets of error patterns were used for all addition and subtraction items. Errors for other questions are described in the Final Report of the Mathematics Assessment.

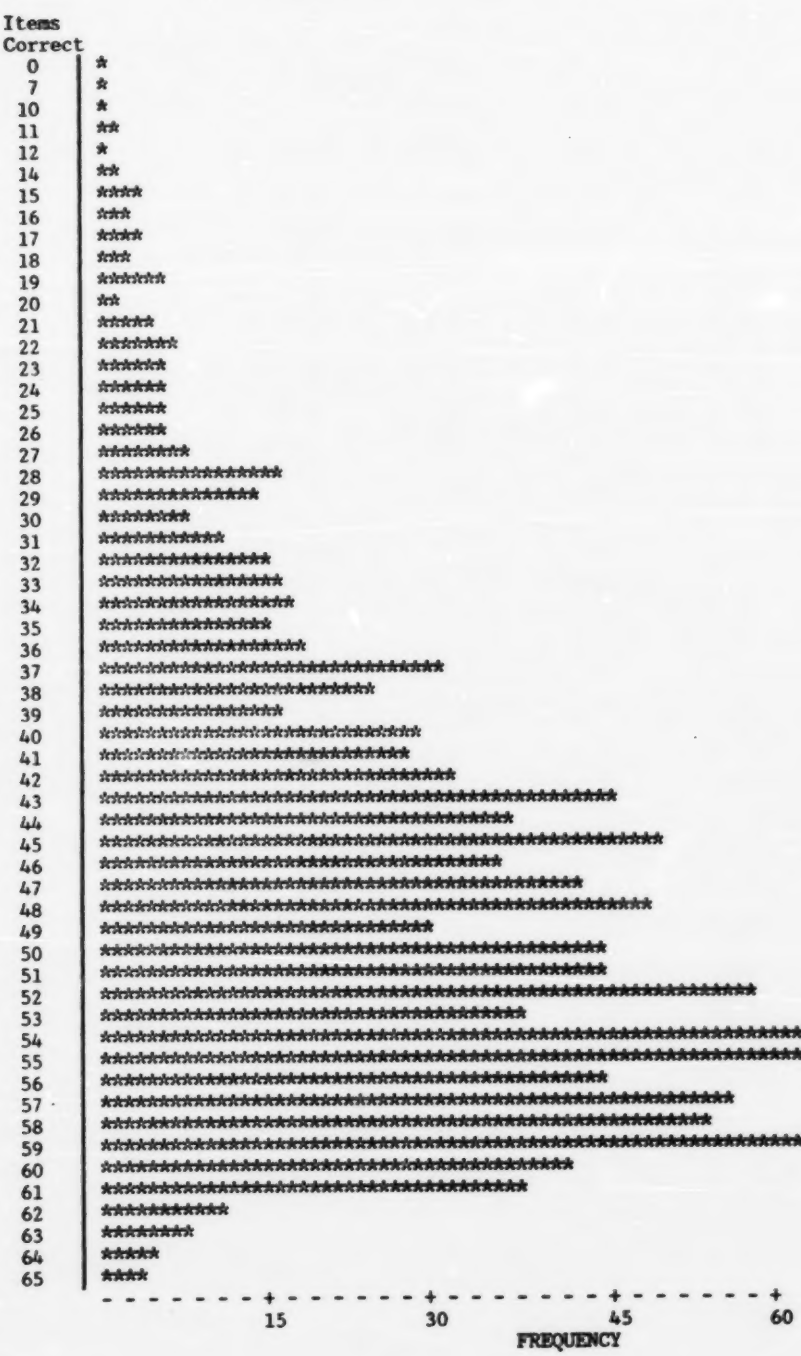
| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 1 | 98.0* | 0.6 | 0.3 | 0.0 | 0.4 | 0.6 |
| 2 | 91.5* | 1.9 | 0.2 | 0.2 | 4.6 | 1.6 |
| 3 | 79.7* | 12.2 | 0.1 | 0.2 | 5.9 | 1.9 |
| 4 | 0.4 | 1.5 | 0.9 | 96.1* | 0.8 | 0.4 |
| 5 | 86.3* | 8.7 | 0.9 | 2.0 | 1.2 | 0.9 |
| 6 | 50.1* | 5.1 | 18.2 | 0.1 | 21.6 | 4.9 |
| 7 | 42.3* | 6.8 | 8.3 | 14.2 | 23.3 | 5.1 |
| 8 | 85.6* | 8.8 | 3.5 | 0.0 | 1.2 | 0.9 |

| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 9 | 89.9* | 4.2 | 4.1 | 0.0 | 0.7 | 1.1 |
| 10 | 4.2 | 87.0* | 7.1 | 0.0 | 0.8 | 0.9 |
| 11 | 2.2 | 11.7 | 83.5* | 0.2 | 0.9 | 1.6 |
| 12 | 94.8* | 1.2 | 0.3 | 0.2 | 2.1 | 1.4 |
| 13 | 88.0* | 4.8 | 0.2 | 3.3 | 2.1 | 1.6 |
| 14 | 94.1* | 3.0 | 0.0 | 0.2 | 1.4 | 1.2 |
| 15 | 78.6* | 11.2 | 0.0 | 3.4 | 4.8 | 2.0 |
| 16 | 94.9* | 1.7 | 0.1 | 0.2 | 1.3 | 1.9 |
| 17 | 91.5* | 2.0 | 0.0 | 3.1 | 2.4 | 1.0 |
| 18 | 73.8* | 12.5 | 0.1 | 6.6 | 5.5 | 1.5 |
| 19 | 93.3* | 3.3 | 0.0 | 0.2 | 1.8 | 1.5 |
| 20 | 83.7* | 6.9 | 0.1 | 3.3 | 4.6 | 1.4 |
| 21 | 77.6* | 12.6 | 0.1 | 4.1 | 4.5 | 1.1 |
| 22 | 10.6 | 2.9 | 11.9* | 72.1 | 0.3 | 2.3 |
| 23 | 13.7* | 10.5 | 67.3 | 5.9 | 0.1 | 2.5 |
| 24 | 90.6* | 2.9 | 2.8 | 0.2 | 1.7 | 1.8 |
| 25 | 60.0* | 3.5 | 25.7 | 2.7 | 5.7 | 2.3 |
| 26 | 88.5* | 3.8 | 0.8 | 0.9 | 4.4 | 1.6 |
| 27 | 60.4* | 3.8 | 23.5 | 3.5 | 6.6 | 2.2 |
| 28 | 93.3* | 1.6 | 2.3 | 0.2 | 1.2 | 1.5 |
| 29 | 59.0* | 3.7 | 26.2 | 3.3 | 5.8 | 2.0 |
| 30 | 59.6* | 3.4 | 25.5 | 2.9 | 5.9 | 2.7 |
| 31 | 9.3 | 38.3* | 41.9 | 7.2 | 0.2 | 3.1 |
| 32 | 48.5 | 28.2* | 11.2 | 7.8 | 0.3 | 3.9 |
| 33 | 76.8* | 6.2 | 1.2 | 1.2 | 10.6 | 3.9 |
| 34 | 58.3* | 6.9 | 6.5 | 1.1 | 22.5 | 4.8 |
| 35 | 69.9* | 8.9 | 1.2 | 2.4 | 12.6 | 4.9 |
| 36 | 55.3* | 13.0 | 6.9 | 1.6 | 16.8 | 6.2 |
| 37 | 92.1* | 1.9 | 1.5 | 0.0 | 0.1 | 4.4 |
| 38 | 1.6 | 85.3* | 8.0 | 0.0 | 0.5 | 4.5 |
| 39 | 81.1* | 4.8 | 2.0 | 0.1 | 6.0 | 5.9 |
| 40 | 1.0 | 80.9* | 0.4 | 0.8 | 11.9 | 5.1 |
| 41 | 4.8 | 14.2 | 53.8* | 4.3 | 15.7 | 7.3 |
| 42 | 67.6* | 1.2 | 0.4 | 18.1 | 3.9 | 8.9 |

| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 43 | 80.0* | 0.0 | 0.2 | 0.0 | 12.0 | 7.8 |
| 44 | 81.4* | 0.0 | 0.0 | 0.0 | 10.8 | 7.8 |
| 45 | 90.9* | 0.1 | 0.1 | 0.0 | 1.6 | 7.3 |
| 46 | 72.2* | 6.8 | 5.5 | 0.5 | 7.4 | 7.6 |
| 47 | 32.8* | 17.7 | 29.5 | 0.0 | 8.9 | 11.2 |
| 48 | 6.8* | 10.0 | 47.0 | 17.7 | 7.3 | 11.2 |
| 49 | 40.6* | 42.2 | 0.2 | 0.1 | 5.7 | 11.3 |
| 50 | 41.3* | 14.8 | 10.4 | 8.0 | 13.1 | 12.4 |
| 51 | 78.5* | 9.2 | 0.4 | 0.2 | 9.4 | 2.3 |
| 52 | 89.0* | 3.6 | 0.6 | 0.1 | 4.4 | 2.3 |
| 53 | 83.9* | 5.9 | 0.4 | 0.1 | 7.6 | 2.2 |
| 54 | 82.0* | 8.0 | 0.4 | 0.1 | 6.5 | 3.1 |
| 55 | 93.1* | 1.6 | 0.5 | 0.1 | 3.0 | 1.7 |
| 56 | 56.3* | 4.9 | 5.5 | 0.5 | 28.2 | 4.5 |
| 57 | 65.4* | 5.7 | 4.5 | 0.5 | 20.4 | 3.4 |
| 58 | 71.5* | 2.3 | 3.4 | 0.3 | 18.4 | 4.2 |
| 59 | 67.9* | 3.3 | 3.5 | 0.3 | 20.4 | 4.5 |
| 60 | 56.6* | 4.7 | 2.1 | 0.2 | 30.8 | 5.5 |
| 61 | 38.2* | 8.3 | 3.2 | 3.8 | 38.5 | 8.0 |
| 62 | 68.9* | 7.9 | 2.0 | 0.0 | 13.3 | 8.0 |
| 63 | 75.8* | 5.1 | 1.8 | 0.1 | 9.5 | 7.6 |
| 64 | 72.3* | 5.0 | 1.7 | 0.1 | 11.7 | 9.2 |
| 65 | 77.8* | 2.5 | 2.0 | 0.1 | 9.2 | 8.3 |
| 66 | 66.7* | 7.9 | 1.8 | 0.1 | 14.0 | 9.6 |
| 67 | 80.4* | 2.6 | 2.0 | 0.1 | 6.6 | 8.3 |
| 68 | 73.3* | 2.0 | 9.2 | 0.0 | 7.5 | 8.0 |
| 69 | 89.5* | 0.5 | 0.0 | 0.0 | 3.9 | 6.1 |
| 70 | 80.0* | 4.0 | 1.5 | 0.1 | 6.9 | 7.6 |
| 71 | 67.3* | 0.9 | 23.6 | 0.0 | 5.5 | 2.7 |
| 72 | 49.9* | 3.5 | 20.7 | 0.0 | 19.1 | 6.8 |
| 73 | 69.8* | 8.1 | 3.2 | 3.1 | 11.0 | 4.8 |
| 74 | 61.5* | 8.1 | 8.8 | 3.1 | 14.0 | 4.4 |
| 75 | 63.0* | 11.8 | 0.9 | 0.9 | 18.2 | 5.1 |
| 76 | 52.0* | 2.4 | 24.7 | 4.3 | 10.5 | 6.0 |

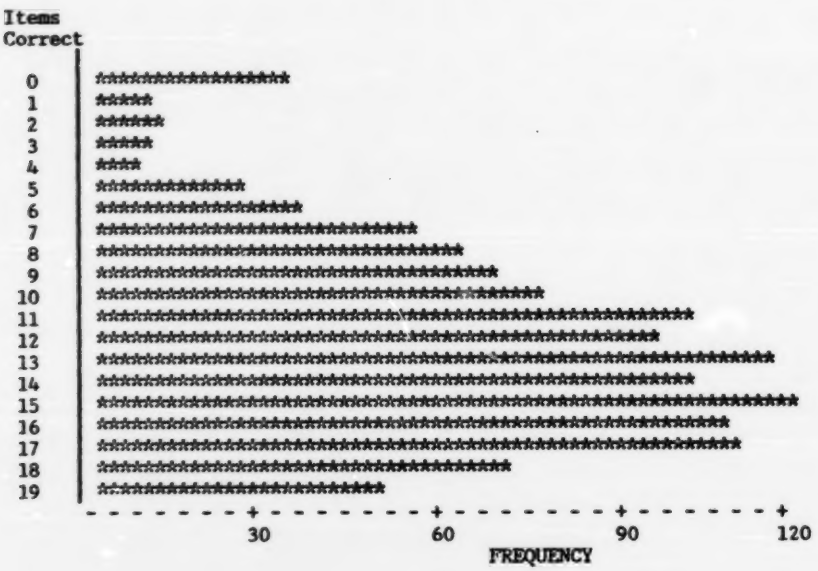
| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 77 | 80.6* | 2.5 | 1.5 | 0.0 | 11.1 | 4.4 |
| 78 | 91.8* | 1.6 | 0.0 | 1.6 | 1.8 | 3.2 |
| 79 | 93.3* | 0.2 | 0.2 | 1.0 | 2.3 | 3.0 |
| 80 | 12.2 | 14.0 | 69.0* | 0.0 | 0.1 | 4.6 |
| 81 | 64.0* | 10.2 | 21.1 | 0.0 | 0.2 | 4.4 |
| 82 | 14.0 | 64.6* | 16.6 | 0.0 | 0.1 | 4.7 |
| 83 | 21.5 | 18.3 | 55.6* | 0.1 | 0.2 | 4.4 |
| 84 | 32.4 | 59.3* | 0.2 | 0.0 | 0.2 | 7.8 |
| 85 | 81.9* | 12.2 | 0.1 | 0.0 | 0.2 | 5.6 |
| 86 | 91.1* | 0.3 | 0.2 | 0.0 | 2.8 | 5.6 |
| 87 | 5.1 | 65.7* | 23.9 | 0.1 | 0.1 | 5.1 |
| 88 | 63.2* | 10.7 | 0.3 | 1.4 | 16.3 | 8.1 |
| 89 | 64.0* | 2.2 | 1.1 | 8.2 | 14.1 | 10.5 |
| 90 | 47.1* | 12.8 | 3.4 | 10.4 | 14.8 | 11.5 |
| 91 | 32.9 | 58.4* | 0.0 | 0.1 | 0.1 | 8.5 |
| 92 | 47.6* | 44.0 | 0.0 | 0.0 | 0.2 | 8.3 |
| 93 | 49.1* | 3.7 | 9.3 | 16.8 | 12.9 | 8.1 |
| 94 | 20.1 | 7.0 | 55.0* | 8.5 | 0.4 | 9.0 |
| 95 | 73.5* | 15.8 | 0.9 | 0.0 | 0.2 | 9.8 |
| 96 | 10.3 | 5.7 | 73.7* | 0.1 | 0.1 | 10.1 |
| 97 | 4.1 | 5.5 | 69.1* | 8.8 | 1.7 | 10.7 |
| 98 | 71.1* | 11.2 | 2.3 | 0.1 | 5.1 | 10.1 |
| 99 | 85.2* | 0.1 | 0.2 | 0.1 | 3.7 | 10.7 |
| 100 | 64.0* | 4.1 | 2.6 | 0.0 | 17.8 | 11.5 |

## GRADE 3 - I. NUMBER SYSTEMS, OPERATIONS, PROPERTIES



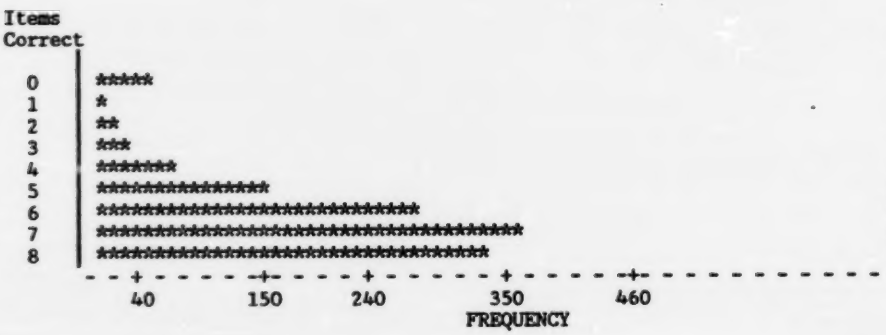

| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 1 | 1 | 0.08 | 0.08 |
| 7 | 1 | 2 | 0.08 | 0.16 |
| 10 | 1 | 3 | 0.08 | 0.23 |
| 11 | 2 | 5 | 0.16 | 0.39 |
| 12 | 1 | 6 | 0.08 | 0.47 |
| 14 | 2 | 8 | 0.16 | 0.62 |
| 15 | 4 | 12 | 0.31 | 0.94 |
| 16 | 3 | 15 | 0.23 | 1.17 |
| 17 | 4 | 19 | 0.31 | 1.48 |
| 18 | 3 | 22 | 0.23 | 1.72 |
| 19 | 6 | 28 | 0.47 | 2.18 |
| 20 | 2 | 30 | 0.16 | 2.34 |
| 21 | 5 | 35 | 0.39 | 2.73 |
| 22 | 7 | 42 | 0.55 | 3.28 |
| 23 | 6 | 48 | 0.47 | 3.74 |
| 24 | 6 | 54 | 0.47 | 4.21 |
| 25 | 6 | 60 | 0.47 | 4.68 |
| 26 | 6 | 66 | 0.47 | 5.15 |
| 27 | 8 | 74 | 0.62 | 5.77 |
| 28 | 16 | 90 | 1.25 | 7.02 |
| 29 | 14 | 104 | 1.09 | 8.11 |
| 30 | 8 | 112 | 0.62 | 8.74 |
| 31 | 11 | 123 | 0.86 | 9.59 |
| 32 | 15 | 138 | 1.17 | 10.76 |
| 33 | 16 | 154 | 1.25 | 12.01 |
| 34 | 17 | 171 | 1.33 | 13.34 |
| 35 | 15 | 186 | 1.17 | 14.51 |
| 36 | 18 | 204 | 1.40 | 15.91 |
| 37 | 30 | 234 | 2.34 | 18.25 |
| 38 | 24 | 258 | 1.87 | 20.12 |
| 39 | 16 | 274 | 1.25 | 21.37 |
| 40 | 28 | 302 | 2.18 | 23.56 |
| 41 | 27 | 329 | 2.11 | 25.66 |
| 42 | 31 | 360 | 2.42 | 28.08 |
| 43 | 45 | 405 | 3.51 | 31.59 |
| 44 | 36 | 441 | 2.81 | 34.40 |
| 45 | 49 | 490 | 3.82 | 38.22 |
| 46 | 35 | 525 | 2.73 | 40.95 |
| 47 | 42 | 567 | 3.28 | 44.23 |
| 48 | 48 | 615 | 3.74 | 47.97 |
| 49 | 29 | 644 | 2.26 | 50.23 |
| 50 | 44 | 688 | 3.43 | 53.67 |
| 51 | 44 | 732 | 3.43 | 57.10 |
| 52 | 57 | 789 | 4.45 | 61.54 |
| 53 | 37 | 826 | 2.89 | 64.43 |
| 54 | 69 | 895 | 5.38 | 69.81 |
| 55 | 68 | 963 | 5.30 | 75.12 |
| 56 | 44 | 1007 | 3.43 | 78.55 |
| 57 | 55 | 1062 | 4.29 | 82.84 |
| 58 | 53 | 1115 | 4.13 | 86.97 |
| 59 | 61 | 1176 | 4.76 | 91.73 |
| 60 | 41 | 1217 | 3.20 | 94.93 |
| 61 | 37 | 1254 | 2.89 | 97.82 |
| 62 | 11 | 1265 | 0.86 | 98.67 |
| 63 | 8 | 1273 | 0.62 | 99.30 |
| 64 | 5 | 1278 | 0.39 | 99.69 |
| 65 | 4 | 1282 | 0.31 | 100.00 |

## GRADE 3 - II. MEASUREMENT



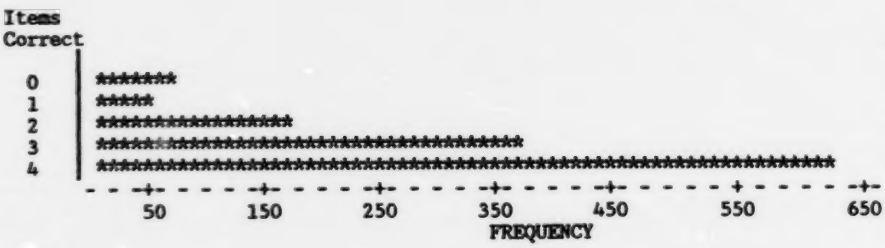

| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 34 | 34 | 2.65 | 2.65 |
| 1 | 9 | 43 | 0.70 | 3.35 |
| 2 | 11 | 54 | 0.86 | 4.21 |
| 3 | 10 | 64 | 0.78 | 4.99 |
| 4 | 8 | 72 | 0.62 | 5.62 |
| 5 | 26 | 98 | 2.03 | 7.64 |
| 6 | 35 | 133 | 2.73 | 10.37 |
| 7 | 55 | 188 | 4.29 | 14.66 |
| 8 | 63 | 251 | 4.91 | 19.58 |
| 9 | 69 | 320 | 5.38 | 24.96 |
| 10 | 78 | 398 | 6.08 | 31.05 |
| 11 | 103 | 501 | 8.03 | 39.08 |
| 12 | 98 | 599 | 7.64 | 46.72 |
| 13 | 118 | 717 | 9.20 | 55.93 |
| 14 | 103 | 820 | 8.03 | 63.96 |
| 15 | 121 | 941 | 9.44 | 73.40 |
| 16 | 109 | 1050 | 8.50 | 81.90 |
| 17 | 112 | 1162 | 8.74 | 90.64 |
| 18 | 71 | 1233 | 5.54 | 96.18 |
| 19 | 49 | 1282 | 3.82 | 100.00 |

## GRADE 3 - III. GEOMETRY



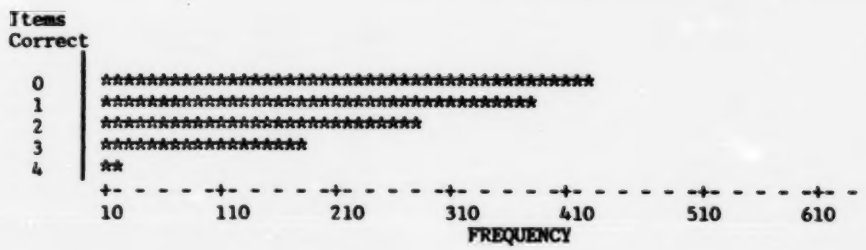

| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 45 | 45 | 3.51 | 3.51 |
| 1 | 9 | 54 | 0.70 | 4.21 |
| 2 | 17 | 71 | 1.33 | 5.54 |
| 3 | 28 | 99 | 2.18 | 7.72 |
| 4 | 65 | 164 | 5.07 | 12.79 |
| 5 | 148 | 312 | 11.54 | 24.34 |
| 6 | 276 | 588 | 21.53 | 45.87 |
| 7 | 358 | 946 | 27.93 | 73.79 |
| 8 | 336 | 1282 | 26.21 | 100.00 |

## GRADE 3 - IV. GRAPHING



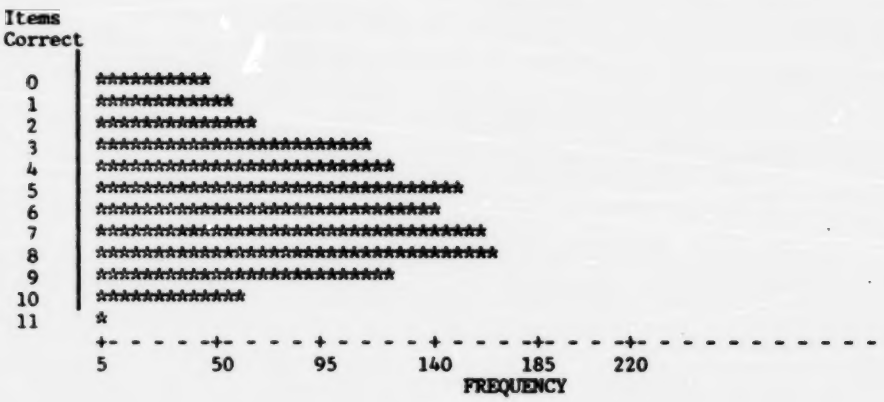

| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 67 | 67 | 5.23 | 5.23 |
| 1 | 50 | 117 | 3.90 | 9.13 |
| 2 | 171 | 288 | 13.34 | 22.46 |
| 3 | 365 | 653 | 28.47 | 50.94 |
| 4 | 629 | 1282 | 49.06 | 100.00 |

## GRADE 3 - V. PROBLEM SOLVING



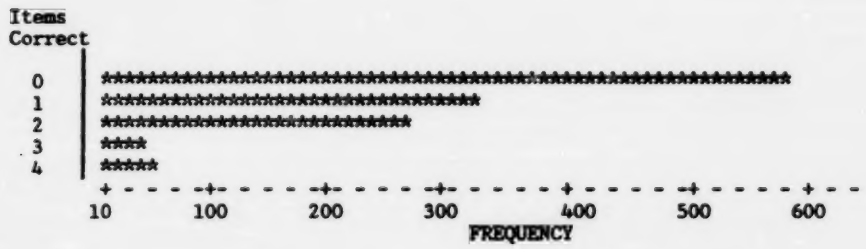

| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 425 | 425 | 33.15 | 33.15 |
| 1 | 382 | 807 | 29.80 | 62.95 |
| 2 | 273 | 1080 | 21.29 | 84.24 |
| 3 | 179 | 1259 | 13.96 | 98.21 |
| 4 | 23 | 1282 | 1.79 | 100.00 |

## GRADE 3 - VI. WORD PROBLEMS




| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 51 | 51 | 3.98 | 3.98 |
| 1 | 63 | 114 | 4.91 | 8.89 |
| 2 | 72 | 186 | 5.62 | 14.51 |
| 3 | 122 | 308 | 9.52 | 24.02 |
| 4 | 131 | 439 | 10.22 | 34.24 |
| 5 | 156 | 595 | 12.17 | 46.41 |
| 6 | 146 | 741 | 11.39 | 57.80 |
| 7 | 165 | 906 | 12.87 | 70.67 |
| 8 | 168 | 1074 | 13.10 | 83.78 |
| 9 | 132 | 1206 | 10.30 | 94.07 |
| 10 | 69 | 1275 | 5.38 | 99.45 |
| 11 | 7 | 1282 | 0.55 | 100.00 |

## GRADE 3 - VII. ESTIMATION




| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 593 | 593 | 46.26 | 46.26 |
| 1 | 330 | 923 | 25.74 | 72.00 |
| 2 | 274 | 1197 | 21.37 | 93.37 |
| 3 | 38 | 1235 | 2.96 | 96.33 |
| 4 | 47 | 1282 | 3.67 | 100.00 |

# CHAPTER 3

## PROVINCIAL RESULTS - GRADE 6

n=1391

| Subtest | Item Numbers | Mean Raw Score | Per Cent | Standard Deviation |
|---|---|---|---|---|
| I.1 Place Value, Regrouping... | 1-8 | 5.39 | 67.36 | 1.99 |
| I.2 Equalities and Inequalities | 9-12 | 2.87 | 71.80 | 0.99 |
| I.3 Factors and Primes.... | 13-16 | 2.26 | 56.38 | 1.03 |
| I.4 Properties | 17-20 | 2.88 | 71.93 | 1.22 |
| I.5 Addition and Subtraction | 21-27 | 4.85 | 69.27 | 1.39 |
| I.6 Multiplication Whole Numbers | 28-32 | 3.57 | 71.46 | 1.07 |
| I.7 Division of Whole Numbers | 51-56 | 3.62 | 60.27 | 1.44 |
| I.8 Fractions and Percent | 57-63 | 4.51 | 64.50 | 1.93 |
| I.9 Operations with Fractions | 64-71 | 4.07 | 50.84 | 2.44 |
| I.10 Operations with Decimals | 72-78 | 3.51 | 50.21 | 1.79 |
| **I. NUMBER SYSTEMS, OPERATIONS - TOTAL (60 items)** | | **37.53** | **62.55** | **11.00** |
| **II. MEASUREMENT** | 33-41 | **4.89** | **54.31** | **2.06** |
| **III. GEOMETRY** | 42-49 | **4.79** | **59.88** | **1.94** |
| **IV. GRAPHING** | 79-84 | **4.56** | **76.07** | **1.47** |
| **V. PROBLEM SOLVING** | 85-87<br>89-90 | **1.33** | **26.57** | **1.06** |
| **VI. WORD PROBLEMS*** | 24, 56,<br>67, 70,<br>75,<br>85-87<br>89, 90 | **4.34** | **43.38** | **2.01** |

* Subtest VI contains items that overlap from other subtests.

# PRELIMINARY REPORT

## PROVINCIAL RESULTS

### MATHEMATICS ASSESSMENT 1987 - GRADE 6

**PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION**

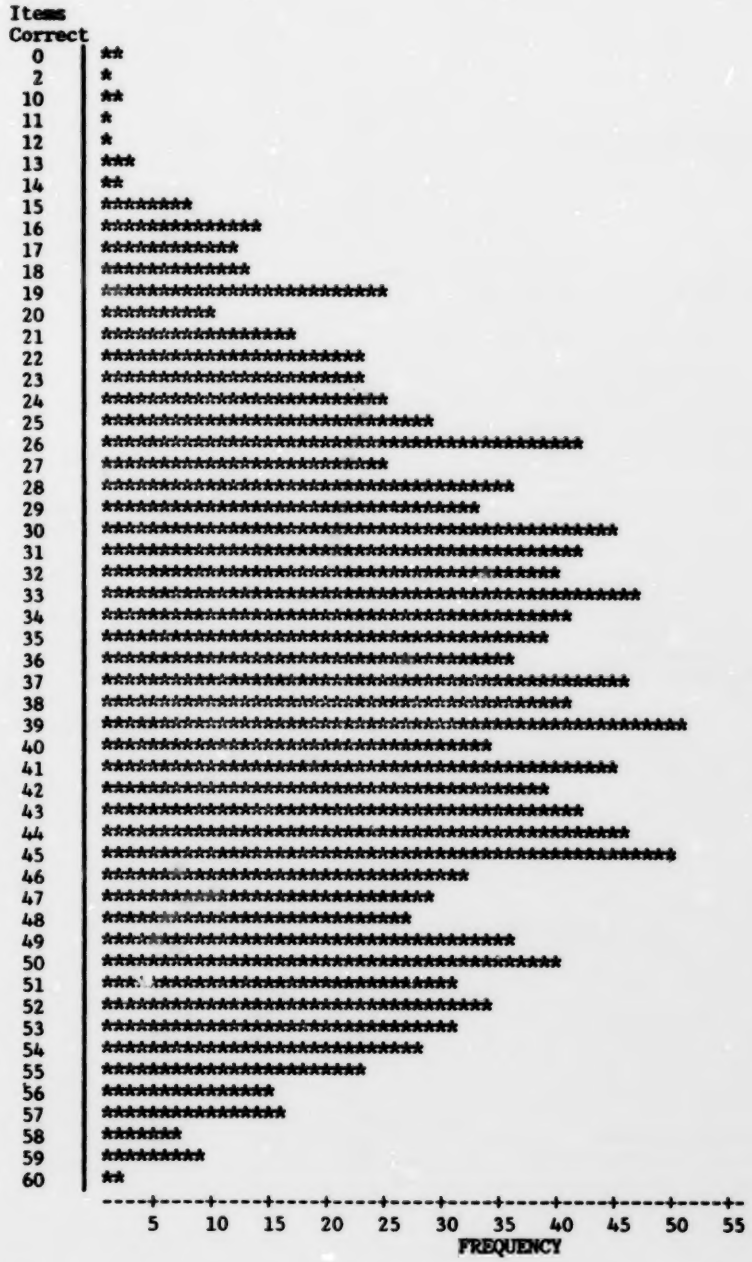
(* INDICATES CORRECT RESPONSE)

| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 1 | 23.8 | 70.8* | 2.8 | 2.2 | 0.1 | 0.4 |
| 2 | 15.6 | 5.9 | 6.9 | 71.2* | 0.1 | 0.3 |
| 3 | 15.5 | 55.0* | 12.1 | 15.8 | 0.3 | 1.3 |
| 4 | 10.7 | 78.1* | 6.3 | 4.0 | 0.0 | 0.9 |
| 5 | 6.5 | 82.7* | 8.2 | 2.0 | 0.0 | 0.6 |
| 6 | 8.6 | 5.9 | 20.1 | 64.6* | 0.3 | 0.5 |
| 7 | 10.9 | 8.0 | 56.6* | 23.9 | 0.2 | 0.4 |
| 8 | 59.7* | 7.8 | 12.3 | 19.6 | 0.1 | 0.4 |
| 9 | 4.6 | 2.8 | 88.9* | 3.2 | 0.0 | 0.5 |
| 10 | 11.6 | 15.5 | 53.3* | 18.5 | 0.3 | 0.8 |
| 11 | 4.7 | 2.0 | 2.2 | 89.9* | 0.4 | 0.8 |
| 12 | 55.1* | 32.8 | 11.1 | 0.4 | 0.1 | 0.5 |
| 13 | 6.9 | 22.0 | 45.8 | 24.0* | 0.1 | 1.2 |
| 14 | 49.7* | 22.2 | 15.4 | 10.7 | 0.4 | 1.5 |
| 15 | 77.4* | 6.2 | 5.3 | 9.8 | 0.0 | 1.3 |
| 16 | 5.4 | 5.6 | 13.9 | 74.3* | 0.3 | 0.4 |
| 17 | 68.5* | 17.8 | 5.5 | 7.1 | 0.2 | 0.9 |
| 18 | 4.9 | 6.9 | 66.1* | 20.3 | 0.7 | 1.0 |
| 19 | 15.1 | 58.5* | 8.1 | 16.6 | 0.6 | 1.1 |
| 20 | 0.9 | 94.5* | 1.0 | 2.8 | 0.2 | 0.5 |
| 21 | 1.5 | 0.6 | 0.5 | 96.8* | 0.1 | 0.4 |
| 22 | 12.3 | 1.4 | 3.7 | 81.7* | 0.1 | 0.8 |
| 23 | 6.9 | 21.8 | 64.8* | 5.8 | 0.1 | 0.7 |
| 24 | 66.9* | 14.6 | 13.4 | 3.6 | 0.4 | 1.0 |
| 25 | 0.9 | 2.0 | 2.3 | 93.6* | 0.3 | 0.9 |
| 26 | 14.0 | 53.4* | 13.6 | 17.0 | 0.9 | 1.2 |
| 27 | 8.1 | 27.7* | 22.2 | 41.0 | 0.3 | 0.6 |

| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 28 | 14.5 | 75.6* | 6.1 | 3.1 | 0.2 | 0.6 |
| 29 | 84.1* | 12.1 | 2.4 | 0.8 | 0.0 | 0.6 |
| 30 | 1.2 | 5.7 | 2.5 | 89.3* | 0.8 | 0.6 |
| 31 | 7.9 | 80.8* | 6.0 | 3.9 | 0.6 | 0.8 |
| 32 | 6.6 | 27.5* | 34.5 | 30.2 | 0.4 | 0.7 |
| 33 | 63.5* | 23.2 | 7.9 | 2.4 | 2.2 | 0.9 |
| 34 | 5.0 | 88.9* | 1.9 | 1.5 | 1.6 | 1.2 |
| 35 | 76.6* | 6.8 | 11.4 | 4.0 | 0.1 | 1.1 |
| 36 | 23.0 | 6.0 | 34.6* | 9.1 | 26.1 | 1.2 |
| 37 | 1.9 | 5.2 | 70.4* | 4.6 | 17.1 | 0.8 |
| 38 | 15.9 | 16.0 | 11.7 | 26.7 | 28.7* | 0.9 |
| 39 | 57.2* | 13.4 | 18.1 | 9.6 | 0.6 | 1.1 |
| 40 | 23.7* | 39.4 | 10.4 | 11.9 | 13.2 | 1.4 |
| 41 | 2.2 | 0.8 | 45.2* | 5.0 | 45.8 | 1.0 |
| 42 | 3.8 | 21.4 | 60.5* | 12.9 | 0.1 | 1.2 |
| 43 | 7.9 | 37.5 | 14.3 | 38.2* | 0.1 | 2.0 |
| 44 | 11.1 | 60.3* | 11.4 | 14.7 | 0.4 | 2.2 |
| 45 | 15.5 | 13.9 | 56.9* | 11.2 | 0.5 | 1.9 |
| 46 | 11.9 | 4.0 | 78.0* | 3.7 | 0.1 | 2.3 |
| 47 | 23.9 | 7.5 | 56.8* | 9.8 | 0.1 | 1.9 |
| 48 | 25.3 | 5.8 | 15.3 | 51.7* | 0.1 | 1.8 |
| 49 | 76.6* | 6.1 | 9.6 | 5.8 | 0.2 | 1.8 |
| 50 | ITEM NO. 50 NOT SCORED - ERROR IN DIAGRAM | | | | | |
| 51 | 12.7 | 72.3* | 4.5 | 9.3 | 0.1 | 1.1 |
| 52 | 56.0 | 15.2 | 1.0 | 26.3* | 0.4 | 1.1 |
| 53 | 4.4 | 84.3* | 6.8 | 3.4 | 0.4 | 0.9 |
| 54 | 10.1 | 70.4* | 9.9 | 7.7 | 0.8 | 1.2 |
| 55 | 19.1 | 6.4 | 15.1 | 36.4* | 21.5 | 1.5 |
| 56 | 1.9 | 8.6 | 72.0* | 15.3 | 0.9 | 1.3 |
| 57 | 8.7 | 67.0* | 5.3 | 16.9 | 1.1 | 1.0 |
| 58 | 4.5 | 29.3 | 8.1 | 56.6* | 0.4 | 1.1 |
| 59 | 67.1* | 5.3 | 9.1 | 17.2 | 0.4 | 0.9 |
| 60 | 24.2 | 12.2 | 61.0* | 0.7 | 0.1 | 1.7 |
| 61 | 16.3 | 5.8 | 70.7* | 5.5 | 0.3 | 1.4 |

| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 62 | 3.2 | 79.8* | 7.0 | 9.0 | 0.1 | 0.9 |
| 63 | 35.4 | 7.2 | 7.0 | 49.2* | 0.3 | 0.9 |
| 64 | 18.8 | 70.6* | 7.9 | 1.9 | 0.0 | 0.8 |
| 65 | 7.6 | 34.9 | 50.7* | 5.2 | 0.4 | 1.2 |
| 66 | 53.8* | 12.4 | 28.5 | 4.0 | 0.4 | 0.9 |
| 67 | 44.3* | 23.4 | 20.0 | 10.6 | 0.4 | 1.4 |
| 68 | 36.4 | 13.4 | 4.6 | 44.3* | 0.4 | 0.9 |
| 69 | 44.4* | 12.7 | 19.3 | 22.0 | 0.7 | 0.9 |
| 70 | 13.9 | 57.9* | 12.8 | 14.1 | 0.3 | 1.1 |
| 71 | 18.3 | 30.4 | 8.5 | 40.8* | 0.6 | 1.4 |
| 72 | 23.1* | 13.7 | 56.6 | 5.3 | 0.4 | 0.9 |
| 73 | 23.7 | 4.8 | 5.0 | 65.1* | 0.2 | 1.2 |
| 74 | 3.9 | 85.8* | 7.3 | 2.0 | 0.1 | 0.9 |
| 75 | 14.5 | 16.0 | 7.8 | 59.9* | 0.5 | 1.4 |
| 76 | 18.2 | 21.7 | 47.2* | 11.5 | 0.4 | 1.1 |
| 77 | 12.7 | 48.0* | 28.2 | 8.8 | 0.7 | 1.6 |
| 78 | 22.6* | 5.4 | 54.0 | 15.6 | 0.6 | 1.8 |
| 79 | 1.5 | 9.5 | 64.1* | 13.6 | 9.6 | 1.7 |
| 80 | 4.4 | 3.8 | 3.0 | 80.7* | 6.2 | 1.9 |
| 81 | 1.2 | 2.4 | 93.0* | 1.5 | 0.2 | 1.7 |
| 82 | 4.5 | 9.6 | 50.1* | 33.1 | 0.9 | 1.7 |
| 83 | 82.6* | 9.1 | 3.1 | 3.2 | 0.1 | 1.9 |
| 84 | 6.5 | 2.6 | 2.9 | 86.0* | 0.1 | 1.9 |
| 85 | 6.6 | 28.3 | 52.8* | 9.6 | 0.2 | 2.5 |
| 86 | 3.7 | 18.0* | 4.5 | 57.7 | 13.7 | 2.4 |
| 87 | 9.3 | 10.9 | 10.3 | 27.6 | 38.8* | 3.1 |
| | ITEM NO. 88 WAS NOT INCLUDED IN ANY SUBTEST ANALYSES | | | | | |
| 88 | 10.1 | 21.1 | 21.6 | 44.0 | 0.9 | 2.4 |
| 89 | 7.2 | 3.7 | 60.8 | 11.5* | 14.2 | 2.5 |
| 90 | 19.7 | 49.6 | 11.8* | 16.2 | 0.4 | 2.3 |

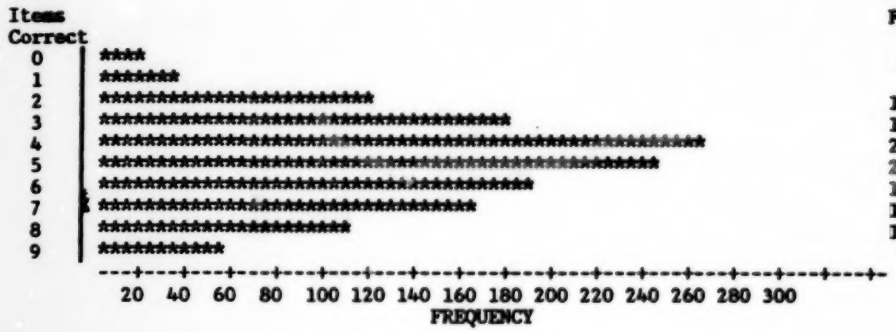
## GRADE 6 - I. NUMBER SYSTEMS, OPERATIONS, AND PROPERTIES




| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 2 | 2 | 0.14 | 0.14 |
| 2 | 1 | 3 | 0.07 | 0.21 |
| 10 | 2 | 5 | 0.14 | 0.35 |
| 11 | 1 | 6 | 0.07 | 0.42 |
| 12 | 1 | 7 | 0.07 | 0.49 |
| 13 | 3 | 10 | 0.22 | 0.71 |
| 14 | 2 | 12 | 0.14 | 0.85 |
| 15 | 8 | 20 | 0.58 | 1.43 |
| 16 | 14 | 34 | 1.01 | 2.44 |
| 17 | 12 | 46 | 0.86 | 3.30 |
| 18 | 13 | 59 | 0.93 | 4.23 |
| 19 | 25 | 84 | 1.80 | 6.03 |
| 20 | 10 | 94 | 0.72 | 6.75 |
| 21 | 17 | 111 | 1.22 | 7.97 |
| 22 | 23 | 134 | 1.65 | 9.62 |
| 23 | 23 | 157 | 1.65 | 11.27 |
| 24 | 25 | 182 | 1.80 | 13.07 |
| 25 | 29 | 211 | 2.08 | 15.15 |
| 26 | 42 | 253 | 3.02 | 18.17 |
| 27 | 25 | 278 | 1.80 | 19.97 |
| 28 | 36 | 314 | 2.59 | 22.56 |
| 29 | 33 | 347 | 2.37 | 24.93 |
| 30 | 45 | 392 | 3.24 | 28.17 |
| 31 | 42 | 434 | 3.02 | 31.19 |
| 32 | 40 | 474 | 2.88 | 34.07 |
| 33 | 47 | 521 | 3.38 | 37.45 |
| 34 | 41 | 562 | 2.95 | 40.40 |
| 35 | 39 | 601 | 2.80 | 43.20 |
| 36 | 36 | 637 | 2.59 | 45.79 |
| 37 | 46 | 683 | 3.31 | 49.10 |
| 38 | 41 | 724 | 2.95 | 52.05 |
| 39 | 51 | 775 | 3.67 | 55.72 |
| 40 | 34 | 809 | 2.44 | 58.16 |
| 41 | 45 | 854 | 3.24 | 61.40 |
| 42 | 39 | 893 | 2.80 | 64.20 |
| 43 | 42 | 935 | 3.02 | 67.22 |
| 44 | 46 | 981 | 3.31 | 70.53 |
| 45 | 50 | 1031 | 3.59 | 74.12 |
| 46 | 32 | 1063 | 2.30 | 76.42 |
| 47 | 29 | 1092 | 2.08 | 78.50 |
| 48 | 27 | 1119 | 1.94 | 80.44 |
| 49 | 36 | 1155 | 2.59 | 83.03 |
| 50 | 40 | 1195 | 2.88 | 85.91 |
| 51 | 31 | 1226 | 2.23 | 88.14 |
| 52 | 34 | 1260 | 2.44 | 90.58 |
| 53 | 31 | 1291 | 2.23 | 92.81 |
| 54 | 28 | 1319 | 2.01 | 94.82 |
| 55 | 23 | 1342 | 1.65 | 96.47 |
| 56 | 15 | 1357 | 1.08 | 97.55 |
| 57 | 16 | 1373 | 1.15 | 98.71 |
| 58 | 7 | 1380 | 0.50 | 99.21 |
| 59 | 9 | 1389 | 0.65 | 99.86 |
| 60 | 2 | 1391 | 0.14 | 100.00 |

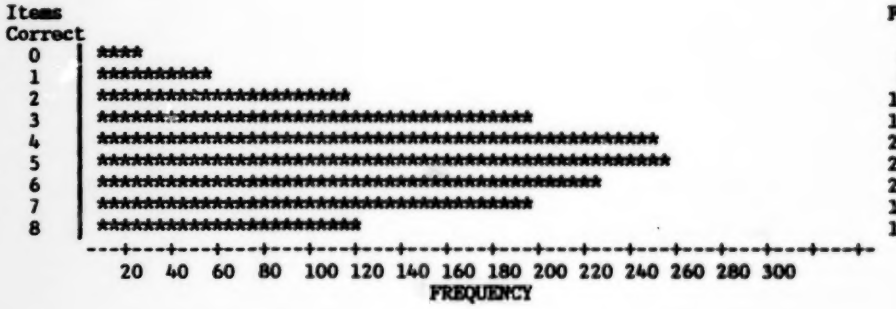
1* = 1 student

## GRADE 6 - II. MEASUREMENT



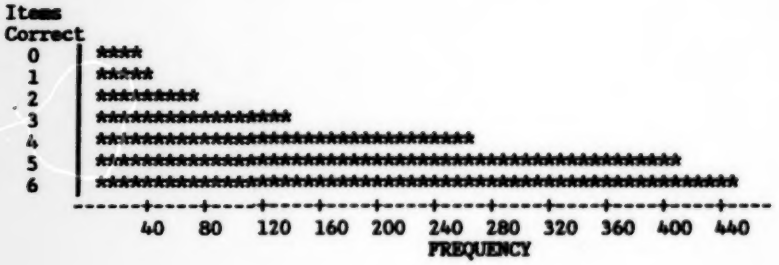

| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 21 | 21 | 1.51 | 1.51 |
| 1 | 37 | 58 | 2.66 | 4.17 |
| 2 | 119 | 177 | 8.55 | 12.72 |
| 3 | 182 | 359 | 13.08 | 25.81 |
| 4 | 263 | 622 | 18.91 | 44.72 |
| 5 | 244 | 866 | 17.54 | 62.26 |
| 6 | 192 | 1058 | 13.80 | 76.06 |
| 7 | 167 | 1225 | 12.01 | 88.07 |
| 8 | 109 | 1334 | 7.84 | 95.90 |
| 9 | 57 | 1391 | 4.10 | 100.00 |

## GRADE 6 - III. GEOMETRY



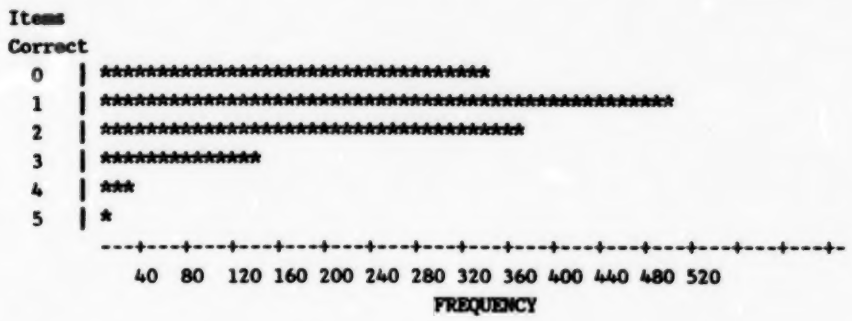

| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 20 | 20 | 1.44 | 1.44 |
| 1 | 49 | 69 | 3.52 | 4.96 |
| 2 | 109 | 178 | 7.84 | 12.80 |
| 3 | 191 | 369 | 13.73 | 26.53 |
| 4 | 243 | 612 | 17.47 | 44.00 |
| 5 | 250 | 862 | 17.97 | 61.97 |
| 6 | 219 | 1081 | 15.74 | 77.71 |
| 7 | 193 | 1274 | 13.87 | 91.59 |
| 8 | 117 | 1391 | 8.41 | 100.00 |

## GRADE 6 - IV. GRAPHING



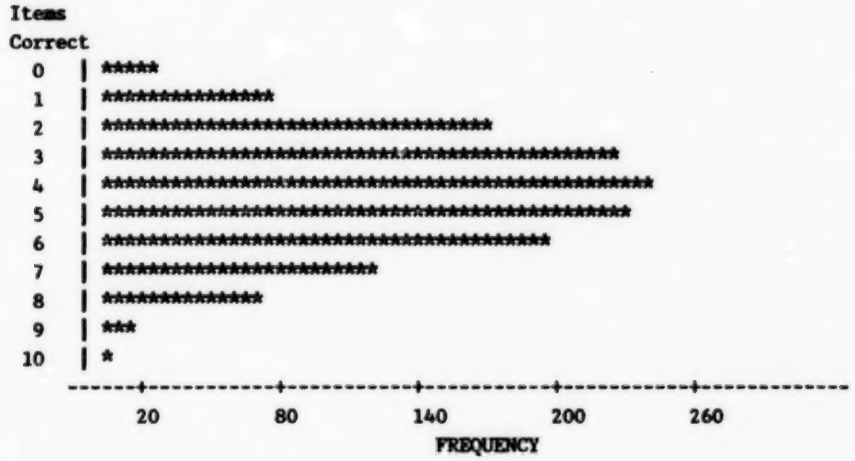

| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 30 | 30 | 2.16 | 2.16 |
| 1 | 39 | 69 | 2.80 | 4.96 |
| 2 | 72 | 141 | 5.18 | 10.14 |
| 3 | 134 | 275 | 9.63 | 19.77 |
| 4 | 264 | 539 | 18.98 | 38.75 |
| 5 | 404 | 943 | 29.04 | 67.79 |
| 6 | 448 | 1391 | 32.21 | 100.00 |

## GRADE 6 - V. PROBLEM SOLVING




| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 337 | 337 | 24.23 | 24.23 |
| 1 | 496 | 833 | 35.66 | 59.88 |
| 2 | 372 | 1205 | 26.74 | 86.63 |
| 3 | 146 | 1351 | 10.50 | 97.12 |
| 4 | 30 | 1381 | 2.16 | 99.28 |
| 5 | 10 | 1391 | 0.72 | 100.00 |

## GRADE 6 - VI. WORD PROBLEMS




| Items Correct | FREQ | CUM. FREQ | PERCENT | CUM PERCENT |
|---|---|---|---|---|
| 0 | 24 | 24 | 1.73 | 1.73 |
| 1 | 78 | 102 | 5.61 | 7.33 |
| 2 | 171 | 273 | 12.29 | 19.63 |
| 3 | 233 | 506 | 16.75 | 36.38 |
| 4 | 242 | 748 | 17.40 | 53.77 |
| 5 | 236 | 984 | 16.97 | 70.74 |
| 6 | 199 | 1183 | 14.31 | 85.05 |
| 7 | 118 | 1301 | 8.48 | 93.53 |
| 8 | 68 | 1369 | 4.89 | 98.42 |
| 9 | 17 | 1386 | 1.22 | 99.64 |
| 10 | 5 | 1391 | 0.36 | 100.00 |

# CHAPTER 4

# PROVINCIAL RESULTS - GRADE 9

Core Topics n=2138 df=24

| Subtest | Number of Items | Mean Score | Standard Error of Measurement | Percent |
|---|---|---|---|---|
| 1. Real Number Systems | 13 | 6.47 | 0.052 | 49.8 |
| 2. Construction Geometry | 5 | 2.54 | 0.021 | 50.8 |
| 3. Open Expressions | 10 | 6.16 | 0.050 | 61.6 |
| 4. Equations | 8 | 4.85 | 0.045 | 60.6 |
| 5. Word Problems (routine) | 11 | 5.87 | 0.039 | 53.4 |
| 6. Word Problems (non-routine) | 5 | 2.26 | 0.019 | 45.2 |
| Part A Non-Calculator | 25 | 13.88 | 0.101 | 55.5 |
| Part B Calculator use | 27 | 14.29 | 0.095 | 52.9 |

Item Numbers Appearing in each Subtest

| CORE TOPICS | ITEM NUMBERS | |
|---|---|---|
| | **Part A** | **Part B** |
| 1. Real Number System | 1-3 | 54 |
| | 5,6 | 61 |
| | 8-11 | |
| | 15,16 | |
| 2. Construction Geometry | 24 | 51 |
| | 25 | 71 |
| | | 72 |
| 3. Open Expressions | 13,14 | 56-60 |
| | 17-19 | |
| 4. Equations | 20-23 | 62-65 |
| 5. Word Problems (routine) | 4 | 52,53 |
| | 7 | 55 |
| | 12 | 66-70 |
| 6. Word Problems (non-routine) | | 73-77 |
| 7. Part A (non-calculator) | 1-25 | |
| 8. Part B (calculator use) | | 51-77 |

| Options (Do 2 of 5) Option No. | **Part C** |
|---|---|
| 1. Algebra | 101-105 |
| 2. Consumer Related Topics | 111-115 |
| 3. Coordinate Graphing | 121-125 |
| 4. Statistics | 131-135 |
| 5. Geometry | 141-145 |

## Grade 9 - Option Topics
## (Each option has 5 items)

### Option 1 - Algebra

n=2021 df=21

| Mean Score | Standard Error of Measure | Percent |
|---|---|---|
| 2.2802 | 0.027 | 45.6 |

Provincial data are reported for this option as 95% of students selected it as one of their two options. Other options were selected by a much smaller number of students; therefore data are reported on a stratum basis. These data should be interpreted with cauttion as not all sample schools within a stratum chose the same options.

### Option 2 - Consumer Related Topics

| | n | Mean | Percent |
|---|---|---|---|
| Stratum 1 | 485 | 2.5070 | 50.1 |
| 2 | Insufficient number of students | | |
| 3 | 191 | 3.7134 | 74.3 |
| 4 | 12 | 3.0833 | 61.7 |
| 5 | 105 | 3.1301 | 62.6 |

### Option 3 - Coordinate Graphing

| | n | Mean | Percent |
|---|---|---|---|
| Stratum 1 | 235 | 2.3382 | 46.8 |
| 2 | Insufficient number of students | | |
| 3 | 148 | 1.8446 | 36.9 |
| 4 | 36 | 1.9167 | 38.3 |
| 5 | 270 | 2.3523 | 47.0 |

### Option 4 - Statistics

| | n | Mean | Percent |
|---|---|---|---|
| Stratum 1 | 17 | 1.4667 | 29.3 |
| 2 | Insufficient number of students | | |
| 3 | - | -* | |
| 4 | - | -* | |
| 5 | 25 | 3.6000 | 72.0 |

### Option 5 - Geometry

| | n | Mean | Percent |
|---|---|---|---|
| Stratum 1 | 519 | 2.3585 | 47.2 |
| 2 | - | -* | |
| 3 | - | -* | |
| 4 | 18 | 1.5556 | 31.1 |
| 5 | 158 | 2.6723 | 53.4 |

*No students in the stratum selected this option.

# PRELIMINARY REPORT

## PROVINCIAL RESULTS

### MATHEMATICS ASSESSMENT 1987 - GRADE 9

**PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION**

(* INDICATES CORRECT RESPONSE)

| QUESTION PART A | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 1 | 26.9 | 50.3* | 9.5 | 8.9 | 4.0 | 0.4 |
| 2 | 12.1 | 56.1* | 6.8 | 10.3 | 14.3 | 0.4 |
| 3 | 29.8 | 8.3 | 41.6* | 10.8 | 9.3 | 0.2 |
| 4 | 3.2 | 9.6 | 22.7 | 60.9* | 3.5 | 0.1 |
| 5 | 49.4* | 11.0 | 4.9 | 30.2 | 4.3 | 0.2 |
| 6 | 31.8* | 27.2 | 6.1 | 12.1 | 22.2 | 0.6 |
| 7 | 6.0 | 4.1 | 60.9* | 10.2 | 18.5 | 0.3 |
| 8 | 6.7 | 38.8 | 17.8 | 28.8* | 7.2 | 0.7 |
| 9 | 75.4* | 7.2 | 10.9 | 4.4 | 1.9 | 0.2 |
| 10 | 19.4 | 6.5 | 12.3 | 51.1* | 10.3 | 0.4 |
| 11 | 6.3 | 21.0 | 10.6 | 5.6 | 56.4* | 0.1 |
| 12 | 2.4 | 57.9 | 9.2 | 3.7 | 26.5* | 0.3 |
| 13 | 70.9* | 7.9 | 6.1 | 6.6 | 7.7 | 0.8 |
| 14 | 11.7 | 3.4 | 15.7 | 63.3* | 5.1 | 0.8 |
| 15 | 8.0 | 4.6 | 62.6* | 6.5 | 17.9 | 0.4 |
| 16 | 7.8 | 35.4* | 10.9 | 4.8 | 40.8 | 0.3 |
| 17 | 6.1 | 6.2 | 76.5* | 8.2 | 2.5 | 0.5 |
| 18 | 23.0 | 5.8 | 38.6 | 29.7* | 2.5 | 0.4 |
| 19 | 5.7 | 69.1* | 7.7 | 13.1 | 3.7 | 0.7 |
| 20 | 14.6 | 5.1 | 70.5* | 8.0 | 1.3 | 0.5 |
| 21 | 1.9 | 3.6 | 87.6* | 4.7 | 1.6 | 0.6 |

| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 22 | 11.3 | 5.1 | 5.2 | 5.1 | 72.5* | 0.8 |
| 23 | 63.9* | 19.5 | 6.8 | 5.3 | 3.4 | 1.1 |
| 24 | 21.2 | 17.4 | 19.6 | 7.8 | 32.5* | 1.5 |
| 25 | 3.0 | 10.0 | 11.8 | 8.8 | 64.1* | 2.3 |
| PART B | | | | | | |
| 51 | 2.4 | 24.0 | 7.0 | 60.0* | 6.1 | 0.5 |
| 52 | 5.8 | 77.4* | 5.4 | 4.4 | 6.9 | 0.1 |
| 53 | 71.7* | 11.5 | 6.7 | 5.4 | 4.5 | 0.2 |
| 54 | 6.6 | 4.8 | 53.4* | 28.4 | 6.1 | 0.7 |
| 55 | 44.1 | 26.1* | 16.7 | 3.7 | 8.7 | 0.7 |
| 56 | 14.4 | 69.0* | 7.5 | 5.3 | 3.4 | 0.4 |
| 57 | 6.5 | 71.8* | 10.4 | 6.4 | 4.5 | 0.4 |
| 58 | 9.8 | 2.8 | 17.2 | 7.4 | 62.6* | 0.2 |
| 59 | 23.1 | 10.8 | 39.8* | 16.8 | 8.9 | 0.6 |
| 60 | 13.0 | 12.8 | 6.3 | 3.6 | 63.7* | 0.6 |
| 61 | 8.3 | 12.3 | 55.1* | 9.5 | 14.5 | 0.3 |
| 62 | 9.9 | 12.8 | 12.7 | 54.7* | 9.1 | 0.8 |
| 63 | 42.1* | 11.6 | 21.4 | 14.5 | 9.9 | 0.5 |
| 64 | 12.6 | 12.8 | 20.2 | 9.2 | 44.3* | 0.9 |
| 65 | 6.8 | 16.0 | 49.7* | 16.0 | 9.9 | 1.6 |
| 66 | 16.4 | 8.5 | 9.8 | 56.3* | 8.3 | 0.7 |
| 67 | 31.9 | 19.7 | 34.6* | 7.4 | 6.1 | 0.3 |
| 68 | 5.8 | 7.7 | 77.9* | 5.5 | 2.7 | 0.4 |
| 69 | 37.2* | 16.9 | 14.1 | 24.0 | 6.6 | 1.2 |
| 70 | 4.9 | 9.0 | 26.5 | 57.8* | 1.4 | 0.4 |
| 71 | 33.3* | 35.3 | 12.4 | 7.0 | 11.2 | 0.8 |

| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 72 | 7.6 | 64.3* | 20.1 | 4.7 | 3.0 | 0.3 |
| 73 | 31.3 | 11.0 | 38.5* | 5.1 | 13.5 | 0.6 |
| 74 | 70.9* | 7.8 | 5.4 | 3.2 | 12.2 | 0.5 |
| 75 | 2.6 | 4.9 | 6.7 | 60.9* | 25.2 | - |
| 76 | 9.3 | 19.2 | 23.6 | 21.4 | 25.1* | 1.4 |
| 77 | 5.3 | 18.8 | 19.4 | 30.7* | 23.6 | 2.2 |

Individual item data were not produced for the five option topics. Due to the nature of the sampling design, and the fact that not all students answered all option topics, it is impossible to provide reliable estimates of the option topic proportions.

# CHAPTER 5

# PROVINCIAL RESULTS - GRADE 12

Grade 12 - 300
Core Topics n=710 df=14

| | | Number of Items | Mean Score | Standard Error of Measurement | Percent |
|---|---|---|---|---|---|
| 1. | Polynomials and Rational Functions | 8 | 4.49 | 0.038 | 56.1 |
| 2. | Circular Functions | 11 | 4.72 | 0.034 | 42.9 |
| 3. | Analytic Geometry | 4 | 1.75 | 0.024 | 43.8 |
| 4. | Exponents and Logarithms | 4 | 1.61 | 0.023 | 40.3 |
| 5. | Sequences and Series | 4 | 1.66 | 0.023 | 41.5 |

Item Numbers Appearing in each Subtest

| | CORE TOPICS | ITEM NUMBERS |
|---|---|---|
| CI | Polynomials and Rational Functions | 1-8 |
| CII | Circular Functions | 9-19 |
| CIII | Analytic Geometry | 20-23 |
| CIV | Exponents and Logarithms | 24-27 |
| CV | Sequences and Series | 28-31 |
| | OPTION TOPICS | |
| O.I | Binomial Theorem | 35-38 |
| O.II | Compound Interest | 41-44 |
| O.III | Sinusoidal Functions | 51-54 |
| O.IV | Circular Functions | 61-64 |
| O.V | Permutations and Combinations | 71-74 |
| O.VI | Conic Sections | 81-84 |
| O.VII | Transformations of Conics | 91-94 |

Math 300 - Option Topics
(Each option has 4 items)

Provincial data are not reported for the options because of the low numbers of students selecting any given option in certain strata. Stratum scores should be interpreted with caution as not all sample schools within a stratum chose the same options.

Option 1 - Binomial Theorem

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 158 | 1.7367 | 43.4 |
| 2 | 104 | 1.6997 | 42.5 |
| 3 | 44 | 2.5682 | 64.2 |
| 4 | 5 | 1.2000 | 30.0 |

Option 2 - Compound Interest

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 16 | 1.1875 | 29.7 |
| 2 | - | -* | - |
| 3 | - | - | - |
| 4 | 15 | 0.7333 | 18.3 |

Option 3 - Sinusoidal Functions

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 3 | 1.3333 | 33.3 |
| 2 | 36 | 0.8079 | 20.2 |
| 3 | - | - | - |
| 4 | 28 | 0.9194 | 23.0 |

Option 4 - Circular Functions

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 4 | 1.0000 | 25.0 |
| 2 | 7 | 0.5714 | 14.3 |
| 3 | 37 | 1.1351 | 28.4 |
| 4 | 8 | 0.8750 | 21.9 |

Option 5 - Permutations and Combinations

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 172 | 1.8425 | 46.1 |
| 2 | 92 | 1.9300 | 48.3 |
| 3 | 44 | 2.3182 | 58.0 |
| 4 | - | - | - |

Option 6 - Conic Sections

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 364 | 2.1805 | 54.5 |
| 2 | 84 | 1.2485 | 31.2 |
| 3 | 37 | 0.7027 | 17.6 |
| 4 | - | - | - |

Option 7 - Transformation of Conics

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 117 | 1.7865 | 44.7 |
| 2 | 25 | 1.0800 | 27.0 |
| 3 | - | - | - |
| 4 | - | - | - |

*No students in the stratum selected this option.

# P R O V I N C I A L  R E S U L T S

## MATHEMATICS ASSESSMENT 1987 - GRADE 12-300

**PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION**

(* INDICATES CORRECT RESPONSE)

| QUESTION PART A | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 1 | 8.2 | 4.3 | 10.9 | 12.4 | 63.4* | 0.8 |
| 2 | 3.7 | 24.1 | 69.0* | 1.2 | 2.0 | - |
| 3 | 3.0 | 4.2 | 57.0* | 11.4 | 24.0 | 0.4 |
| 4 | 16.9 | 41.8* | 16.6 | 12.9 | 11.4 | 0.4 |
| 5 | 27.7 | 35.0* | 28.1 | 4.5 | 4.5 | 0.2 |
| 6 | 3.9 | 2.0 | 86.5* | 3.3 | 4.2 | 0.1 |
| 7 | 57.3* | 2.2 | 32.7 | 6.3 | 1.4 | 0.1 |
| 8 | 9.9 | 8.3 | 23.0 | 18.1 | 39.3* | 1.4 |
| 9 | 4.0 | 7.5 | 20.3 | 61.8* | 6.1 | 0.3 |
| 10 | 26.9 | 8.9 | 47.4* | 10.3 | 6.1 | 0.4 |
| 11 | 9.7 | 30.1 | 43.8* | 8.0 | 7.0 | 1.4 |
| 12 | 25.6 | 12.0 | 14.8 | 36.5* | 10.8 | 0.3 |
| 13 | 76.1* | 14.0 | 6.8 | 1.3 | 1.5 | 0.3 |
| 14 | 20.0 | 16.9 | 12.2 | 14.8 | 34.6* | 1.5 |
| 15 | 47.6 | 11.3 | 5.3 | 22.5 | 13.1* | 0.2 |
| 16 | 24.1 | 11.7 | 13.1 | 32.2* | 17.1 | 1.8 |
| 17 | 13.9 | 41.1* | 20.7 | 10.8 | 11.3 | 2.2 |
| 18 | 3.9 | 50.6* | 8.3 | 10.4 | 26.8 | - |
| 19 | 18.5 | 10.5 | 35.1* | 24.6 | 9.2 | 2.1 |
| 20 | 34.3* | 23.4 | 18.4 | 19.2 | 2.1 | 2.6 |
| 21 | 34.9* | 19.2 | 25.3 | 11.0 | 7.8 | 1.8 |

| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 22 | 10.8 | 7.7 | 70.4* | 4.6 | 5.9 | 0.6 |
| 23 | 3.9 | 35.1* | 2.9 | 7.4 | 50.6 | 0.1 |
| 24 | 12.9 | 15.3 | 14.3 | 50.2* | 6.2 | 1.1 |
| 25 | 20.5 | 14.1 | 32.2* | 14.6 | 18.3 | 0.3 |
| 26 | 24.0* | 11.6 | 17.4 | 5.3 | 41.3 | 0.4 |
| 27 | 54.3* | 13.1 | 15.8 | 9.8 | 5.6 | 1.4 |
| 28 | 13.2 | 54.9* | 10.3 | 12.4 | 6.8 | 2.4 |
| 29 | 35.8* | 14.8 | 34.1 | 8.2 | 6.1 | 1.0 |
| 30 | 9.0 | 48.8* | 10.8 | 10.3 | 19.7 | 1.4 |
| 31 | 13.0 | 23.0 | 15.9 | 26.8* | 15.3 | 6.0 |

Individual item data were not produced for the seven option topics. Due to the nature of the sampling design, and the fact that not all students answered all option topics, it is impossible to provide reliable estimates of the option topic proportions.

Grade 12 - 301
Core Topics n=542 df=21

| | Number of Items | Mean Score | Standard Error of Measurement | Percent |
|---|---|---|---|---|
| 1. Consumer Mathematics | 10 | 6.80 | 0.0389 | 68.0 |
| 2. Algebra | 12 | 6.42 | 0.0537 | 53.5 |
| 3. Trigonometry | 4 | 2.05 | 0.0189 | 51.3 |
| 4. Statistics | 4 | 2.00 | 0.0250 | 50.0 |

Item Numbers Appearing in each Subtest

| | CORE TOPICS | ITEM NUMBERS |
|---|---|---|
| CI | Consumer Mathematics | 1-10 |
| CII | Algebra | 11-22 |
| CIII | Trigonometry | 23-26 |
| CIV | Statistics | 27-30 |
| | OPTION TOPICS | |
| O.I | Annuities | 31-34 |
| O.II | Depreciation | 41-44 |
| O.III | Digital Logic | 51-54 |
| O.IV | Investments | 61-64 |
| O.V | Interpretation of Graphs | 71-74 |
| O.VI | Quadratic Equations | 81-84 |
| O.VII | Transformations of Conics | 91-94 |
| O.VIII | Statistics | 101-104 |

Math 301 - Option Topics
(Each option has 4 items)

Provincial data are not reported for the options because of the low numbers of students selecting any given option in certain strata. Stratum scores should be interpreted with caution as not all sample schools within a stratum chose the same options.

Option 1 - Annuities

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | - | - | - |
| 2 | 20 | 1.3 | 33.0 |
| 3 | - | - | - |
| 4 | - | - | - |

Option 2 - Depreciation

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | - | - | - |
| 2 | 77 | 2.0107 | 50.3 |
| 3 | - | - | - |
| 4 | 5 | 2.2000 | 55.0 |

Option 3 - Digital Logic

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | - | | |
| 2 | - | No students chose this option. | |
| 3 | - | | |
| 4 | - | | |

Option 4 - Investments

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 46 | 1.7125 | 42.8 |
| 2 | 96 | 2.4368 | 60.9 |
| 3 | - | - | |
| 4 | 4 | 1.0000 | 25.0 |

Option 5 - Interpretation of Graphs

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 118 | 2.0165 | 50.4 |
| 2 | 64 | 2.4994 | 62.5 |
| 3 | 24 | 2.6250 | 65.6 |
| 4 | 19 | 2.1615 | 54.0 |

Option 6 - Quadratic Equations

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 171 | 1.0104 | 25.3 |
| 2 | 78 | 1.4248 | 35.6 |
| 3 | 70 | 0.8667 | 21.7 |
| 4 | 16 | 0.6667 | 16.7 |

Option 7 - Permutations & Combinations

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 10 | 1.6000 | 40.0 |
| 2 | 72 | 1.5099 | 37.7 |
| 3 | 40 | 1.6250 | 40.6 |
| 4 | - | - | - |

Option 8 - Statistics

| | n | mean | percent |
|---|---|---|---|
| Stratum 1 | 51 | 1.0980 | 27.5 |
| 2 | 41 | 0.4890 | 12.2 |
| 3 | 6 | 1.8333 | 45.8 |
| 4 | - | - | - |

# P R E L I M I N A R Y  R E P O R T

## P R O V I N C I A L  R E S U L T S

### MATHEMATICS ASSESSMENT 1987 - GRADE 12-301

**PERCENT OF STUDENTS CHOOSING EACH RESPONSE FOR EACH ITEM OR QUESTION**

(* INDICATES CORRECT RESPONSE)

| QUESTION PART A | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 1 | 2.3 | 3.4 | 3.8 | 82.0* | 7.5 | 1.0 |
| 2 | 1.4 | 36.2* | 14.0 | 2.5 | 45.5 | 0.4 |
| 3 | 91.4* | 1.3 | 1.7 | .2 | 4.8 | 0.6 |
| 4 | 1.5 | 2.2 | 69.7 | .7 | 25.8* | 0.1 |
| 5 | 4.1 | 90.2* | 1.2 | 1.6 | 2.6 | 0.3 |
| 6 | 4.8 | 65.5* | 3.6 | 25.0 | .3 | 0.8 |
| 7 | 4.2 | 2.2 | 84.7* | 5.8 | 2.1 | 1.0 |
| 8 | 13.5 | 64.0* | 6.4 | 2.9 | 12.9 | 0.3 |
| 9 | 61.4* | 14.6 | 14.2 | 6.5 | 2.0 | 1.3 |
| 10 | 3.6 | 8.6 | 78.6* | 4.6 | 3.9 | 0.7 |
| 11 | 10.5 | 10.0 | 5.7 | 70.2* | 3.3 | 0.3 |
| 12 | 12.1 | 45.6 | 33.9* | 5.1 | 2.5 | 0.8 |
| 13 | 7.0 | 1.9 | 75.4* | 8.9 | 6.4 | 0.4 |
| 14 | 6.5 | 13.4 | 2.3 | 15.5 | 62.0* | 0.3 |
| 15 | 13.0 | 52.4* | 14.0 | 10.0 | 10.0 | 0.6 |
| 16 | 2.1 | 9.7 | 6.1 | 77.0* | 4.9 | 0.2 |
| 17 | 10.6 | 15.8 | 16.6 | 5.0 | 51.3* | 0.7 |
| 18 | 9.5 | 14.1 | 50.8* | 17.9 | 6.6 | 1.1 |
| 19 | 37.0* | 5.5 | 4.2 | 29.4 | 23.5 | 0.4 |
| 20 | 2.3 | 10.1 | 80.0* | 3.6 | 3.4 | 0:6 |
| 21 | 28.9* | 21.4 | 12.4 | 20.0 | 16.3 | 1.0 |

| QUESTION | A | B | C | D | E | NR |
|---|---|---|---|---|---|---|
| 22 | 3.8 | 53.8 | 12.6 | 23.3* | 5.9 | 0.6 |
| 23 | 12.8 | 2.6 | 9.7 | 64.1* | 10.3 | 0.5 |
| 24 | 4.3 | 17.8 | 13.0 | 16.9 | 46.6* | 1.4 |
| 25 | 2.7 | 6.9 | 14.1 | 73.3* | 1.7 | 1.3 |
| 26 | 15.6 | 25.3 | 27.6 | 21.1* | 8.9 | 1.5 |
| 27 | 3.4 | 5.0 | 76.8* | 3.2 | 11.0 | 0.6 |
| 28 | 16.4 | 55.5* | 7.4 | 16.2 | 4.1 | 0.4 |
| 29 | 50.7* | 10.3 | 8.2 | 12.9 | 16.1 | 1.8 |
| 30 | 8.7 | 9.1 | 16.6* | 28.8 | 34.9 | 1.9 |

Individual item data were not produced for the eight option topics. Due to the nature of the sampling design, and the fact that not all students answered all option topics, it is impossible to provide reliable estimates of the option topic proportions.